

Date: Tuesday, 4/15/2008 3:04:22 PM
 User: Kim Johnston

Process Sheet

Customer : CU-BAR001 Dart Helicopters Services Drawing Name : 212 X-TUBE ,LOW NARROW FWD
 Job Number : 36642
 Estimate Number : 13018
 P.O. Number :
 This Issue : 1/15/2008 S.O. No. :
 Prsht Rev. : NC Part Number : D212664107
 First Issue : 1/7/2008 Type : LANDING GEAR Drawing Number : D212-664-147 ~~UR~~ A CP 08.01.15
 Drawing Revision : ~~UR~~ A
 Previous Run : 36641 Material :
 Due Date : 2/5/2008 Qty: 1 Um: Each
 Written By :
 Checked & Approved By : 08 01 15
 Comment : Est Rev. A New Issue 07.09.12 EC verified by: JLM

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC DOCUMENT CONTROL



KS 08.01.29

Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

08/03/03

2.0 D6019128 Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6019-128 Crosstube B 32310

Check OD = 2.750"; ID = 2.125"

BC 08.01.20

3.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: 1-TURN AS PER FOLIO FA705 & DWG D212-664-147,

FOLIO REV: AA

DWG REV: A

2-DEBURR AS REQUIRED

BC 08.01.20

4.0 QC2 INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

BC 08.01.20

5.0 QC8 SECOND CHECK



Comment: SECOND CHECK

ML 08/01/21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Tuesday, 1/15/2008 3:04:22 PM
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212 X-TUBE LOW NARROW FWD

Job Number: 36642

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Seq. # Machine Or Operation: Description:

6.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

JD 8-1-28

7.0 QC5 INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 8-1-22

8.0 HAND FINISHING1 HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

JD 8-1-24

9.0 QC3/5 INSPECT WORK/WING WALK



Comment: Inspect work & Chemical conversion Coat

Am 08.01.26

10.0 BENDING BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D442-664-243 using CNC bender program #123 and Folio F1010

EL 8-2-4

11.0 QC6 DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

08-02-04

12.0 D36591 CUFF



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

CUFF

Batch:

B 36650

2

V1

8-2-12

13.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1.0 Cut to height EL/JD 8-2-4
1.1-Drill Rivet holes as per Dwg D212-664-147 using DT8972.

2-Drill pilot holes in tube as per Dwg D212-664-147

3-Ream hole to finish size in tube as per Dwg D212-664-147

Am/11

8-2-12

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Job Number: 36642

Part Number: D212664107

Job Number:



Seq. #:

Machine Or Operation:

Description :

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-147

AWM 8-2-12

14.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



AWM 8-2-12



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube & Cuffs as per QSI 005 4.1

15.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

08/02/14 (10)

16.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/02/14 (10)

17.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: *5729* LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

08/02/14 (10)

18.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

08/15 (10)

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

08-2-20 (10)

20.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291

BATCH *M105585*

EL 8-2-20

W/O:		WORK ORDER CHANGES					
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Job Number: 36642

Part Number: D212664107

Job Number:



Seq. #:

Machine Or Operation:

Description :

21.0

CR3212406

CHERRY RIVET



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

CHERRY RIVET

Batch: M104156

Pl 8-2-20 (1)

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

ml 08 02 26

2-Paint outside crosstube with White Imron as per QSI 005 4.2

ET 08-02-20

23.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

ml 08 02 21 (1)

24.0

D28931

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Support

B35579 ml 08 02 21

25.0

D3595

Rubber Cushion (per sq ft)



Comment: Qty.: 0.8295 sf(s)/Unit Total : 0.8295 sf(s)

Rubber Cushion

Cut to .630" X 4.5" Qty 4

Batch: 35124

ml 08 02 21

26.0

MS2192025

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Clamp

Batch: 106398

ml 08 02 21

27.0

AN635A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

BOLT

batch M106242

8/2/3 50 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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Job Number: 36642

Part Number: D212664107

Job Number:



Seq. #:

Machine Or Operation:

Description :

28.0

AN636A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

batch M106883

SCD

(1x)

29.0

MS21042L6



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

batch M105077

SCD

(1x)

30.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

batch M106883

SCD

(1x)

31.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Placard

batch B34954

8/3/3

SCD

(1x)

32.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1
Assemble as per Dwg D212-664-147

Instal support with magnobond 6398 per dwg D212-664-147,
cure for 12hrs before packaging.

Time & date of application: 2:30pm 08/02/21
Batch: M105379 exp: 05/2008

M1 08/02/21 (1)
ET 08-02-29
M 105379 exp 08-11-01

33.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/03/03 (4)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: D Date: 08/03/05
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Process Sheet

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Drawing Name: 212 X-TUBE ,LOW NARROW FWD

Job Number: 36642

Part Number: D212664107

Job Number:



Seq. #:

Machine Or Operation:

Description :

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D212.664-107

DNH

2/3/3

(1)

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

2008/03/05

Job Completion



34.1 QC21 2008/03/05

2008/3/04

(1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	36642
Description: Crosstube Assembly (205/212/412 Low Fwd)		Part Number:	D212-664-147
Inspection Dwg: D212-664-147 Rev: A		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

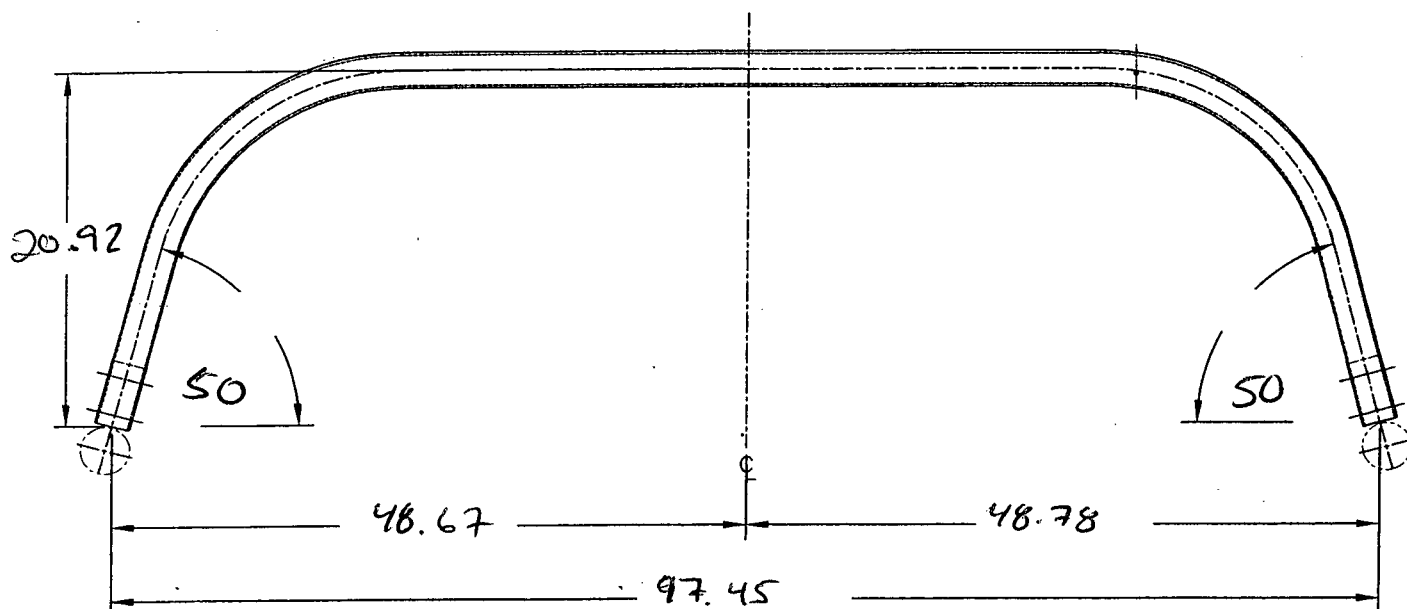
Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.360	$\pm .010$	2.361	✓			
	2.360	$\pm .005$ $\pm .000$	2.364	✓			
	2.366	"	2.370	✓			
	2.743	"	2.744	✓			
	2.573	"	2.576	✓			
	2.673	"	2.674	✓			
SIDE B	126.53	$\pm .020$	126.54	✓			
	2.360	$\pm .010$	2.361	✓			
	2.360	$\pm .005$ $\pm .000$	2.364	✓			
	2.366	"	2.369	✓			
	2.743	"	2.745	✓			
	2.573	"	2.575	✓			
	2.673	"	2.675	✓			

Measured by:	BE	Audited by:	aml	Prototype Approval:	N/A
Date:	08.01.20	Date:	08/01/21	Date:	N/A

Rev	Date	Change	Revised by	Approved
A		New Issue (P/O D212-664-107)	KJ/EC/DD	

DART AEROSPACE LTD		Work Order:	36642
Description: Crosstube Low Fwd (205/212/412)		Part Number:	D212-664-107
Inspection Dwg: D212-664-147 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.8175
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	<i>[Signature]</i>
Date	

08-02-04

Rev	Date	Change	Revised by	Approved
A		New Issue		<i>[Signature]</i>

PARTS LIST:

Qty	Part Number	Description
X	D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
1	D6019-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
2	D3659-1	CUFF
4	MS21920-25	CLAMP (OR MS21920-26)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.53 ± 0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

RELEASED
07 JAN 24

NO. 36042
WORK ORDER
SUBJECT TO AMENDMENT
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ENGINEERING
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SHOP COPY

A		07.07.07	NEW ISSUE
DESIGN	90	DRAWN BY	90
CHECKED	90	APPROVED	90
DATE	07.07.07	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA	
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		SHEET 1 OF 3	
		SCALE	
		TITLE CROSSTUBE (205/212/412 LOW FWD) NTS	

Dart Aerospace Ltd

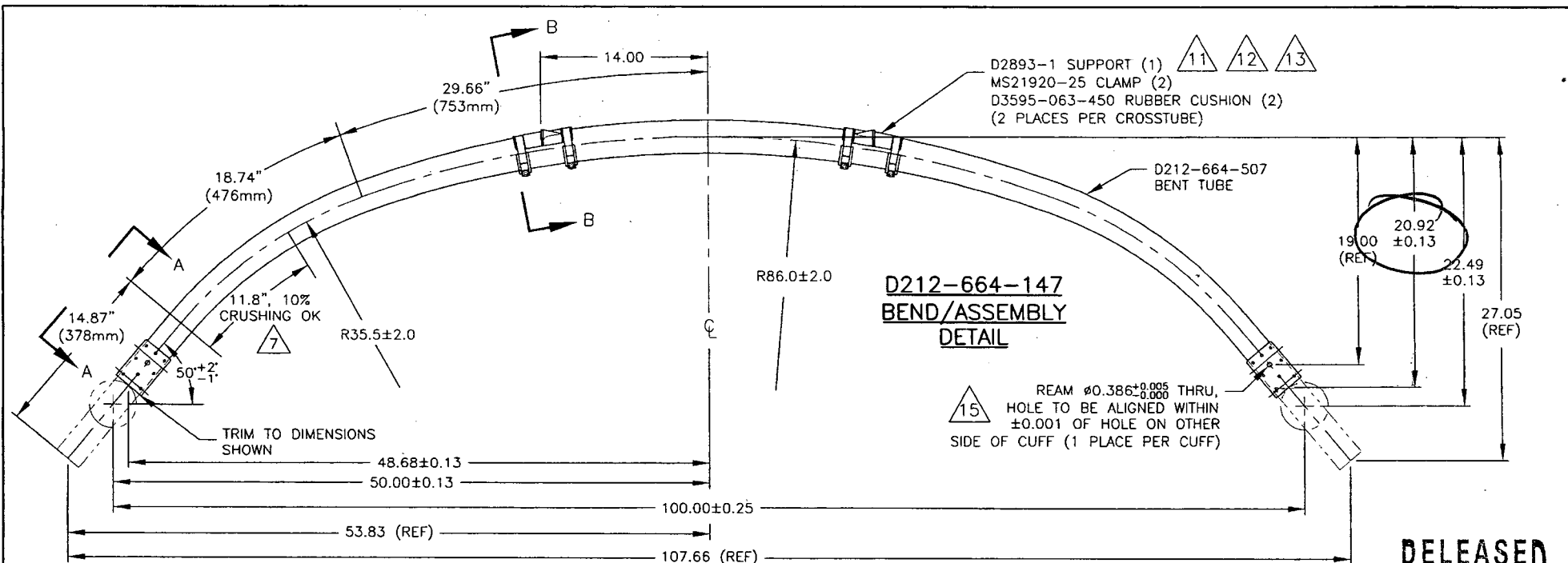
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

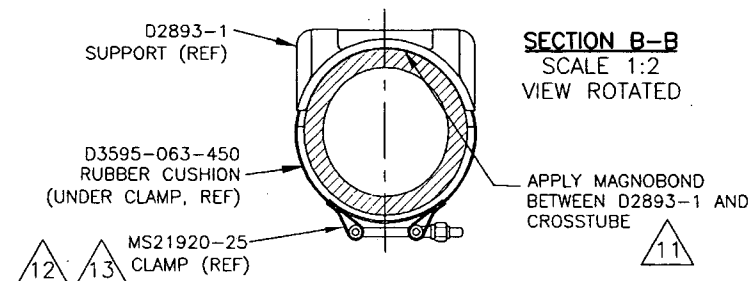
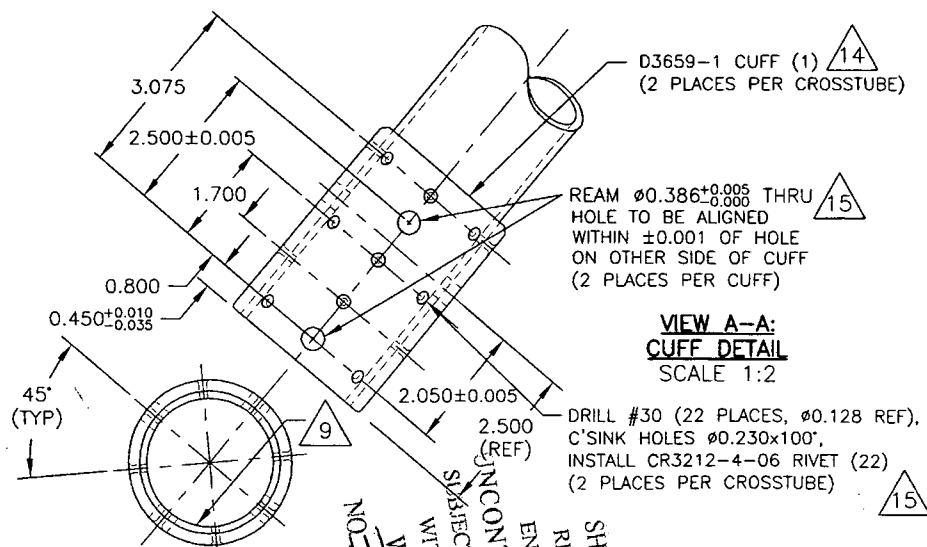
QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



7 97.36



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		DATE		DRAWING NO.	REV. A
		07.07.07		D212-664-147	SHEET 2 OF 3
				TITLE	SCALE
				CROSSTUBE (205/212/412 LOW FWD)	1:8

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WORK ORDER
NO 36642

Dart Aerospace Ltd

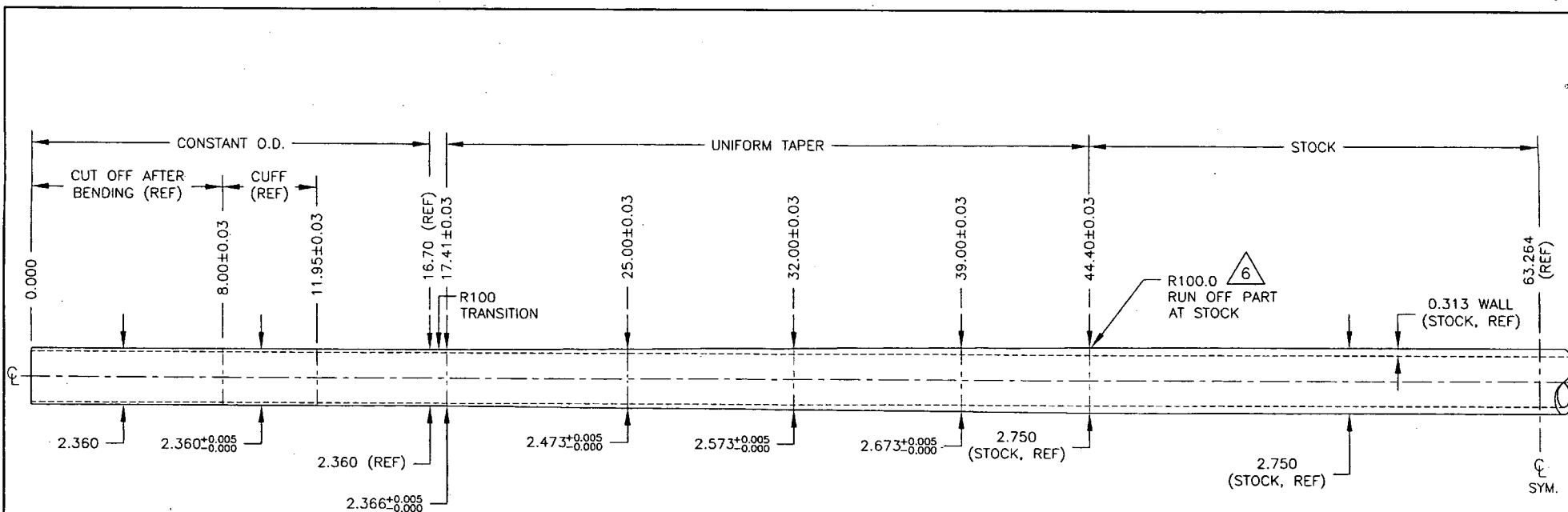
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D212-664-147 MACHINING DETAIL

RELEASED
97.07.24

NO. 36642
WORK ORDER
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DATE 07.07.07		TITLE CROSSTUBE (205/212/412 LOW FWD)		SCALE 1:4	

W/O:		WORK ORDER CHANGES					
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LIQUID PENETRANT TEST REPORT

P- 09830

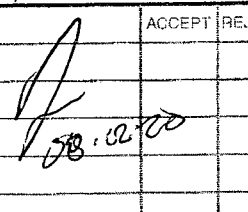
CLIENT Dart AREOSPACE DATE Feb 15, 2008 PAGE 1 OF 1
ATTENTION Linda Lucelle ACUREN JOB NO. 188-08/1220 TIME AM ☐ PM ☐
ADDRESS 1270 Aberdeen st. POWO No. S729
Hawkesbury ontario WORK LOCATION Hawkesbury
ACCEPTANCE STD. ASTM 1417/AS1-038 REV./DATE 2005
PROJECT 212 X-TUBE, LOW NARROW AFT and FWD, 407 HIGH AFT X-TUBE ASSEMBLY, 412 X-TUBE LOW NARROW AFT
ITEM(S) EXAMINED Job# 36642 - 36644 - 36645 - 36768 - 36770 - 36773 - 37009 - 37010

JOB DESCRIPTION PROCEDURE No. LT-XXXX REV./DATE TECHNIQUE No. LT-XXXX-XXX REV./DATE
PART No. D212664107-D212664307-D212664308-D407667205 MATERIAL ALLOYED ALUMINUM
SCOPE WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% OF EXTERNAL SURFACE

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MagnaFluor BLACK LIGHT S/N 8178 ☒ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT ZL67 MINIMUM DWELL TIME 405 MIN. LIGHTING EQUIP. ☒ FLASHLIGHT ☐ TROUBLELIGHT ☒ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER
DEVELOPER SKDS2 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE MAR 08
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION ☒ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

ITEM	COMMENTS	ACCEPT	REJECT
Job# 36642: ACCEPTABLE			
36644: ACCEPTABLE			
36645: ACCEPTABLE			
36768: ACCEPTABLE			
36770: ACCEPTABLE			
36773: ACCEPTABLE			
37009: ACCEPTABLE			
37010: ACCEPTABLE			

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.
Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE Matthew Murdoch DTR #
TECHNICIAN (SIGNATURE): Chagnon Frederick REPORT REVIEWED BY:
NAME (PRINT): Chagnon Frederick NAME INITIALS
1st TECHNICIAN 2nd TECHNICIAN
CGSB LEVEL II SNT LEVEL CGSB LEVEL SNT LEVEL
CGSB REG. NO. 10560 CGSB REG. NO.